CLAIMS:

1. A solid state lasing structure, comprising a field effect transistor in which source and drain electrodes are disposed on semiconducting material forming an active layer on a gate whereby current between the source and drain electrodes defines and flows along a channel in said active layer to define a recombination and emission zone, said active layer comprising a semiconducting light emitting organic polymer.

2. The lasing structure of claim 1 including a gate insulator between the gate and the light emitting organic polymer.

3. The lasing structure of claim 1 in which said gate is supported on a glass substrate.

4. The lasing structure of claim 1 in which said gate is supported on a silicon substrate with SiO_2 on top of the silicon.

5. The lasing structure of claim 1 in which the index of refraction of said light emitting organic polymer and of said gate are greater than the index of refraction of said gate insulator.

6. The lasing structure of claim 3 in which the index of refraction of said light emitting organic polymer and of said gate are greater than the index of refraction of said gate insulator and said glass substrate.

7. The lasing structure of claim 1 in which said gate is formed of indium-tin-oxide.

8. The lasing structure of claim 2 in which said gate insulator is SiO_2.

9. The lasing structure of claim 1 in which said light emitting organic polymer has a 4-level lasing energy system.

10. The lasing structure of claim 1 including an additional layer of semiconducting organic polymer between said source and drain electrodes and said light emitting organic polymer being formed with an n doped region in contact with said source electrode, a p doped region in contact with said drain electrode, and an i region therebetween forming a p-i-n junction.

11. The lasing structure of claim 10 in which said additional layer of organic polymer contains polycations and counteranions and said n and p doped regions have been formed by applying a source-drain voltage while said additional layer is heated to an elevated temperature and for a time sufficient to mobilize the counteranions whereby said n doped and p-doped regions and p-i-n junction are formed upon cooling of the additional layer.

12. The lasing structure of claim 1 in which said structure is formed to be resonant with feedback whereby to generate coherent laser light.

13. The lasing structure of claim 12 comprising Bragg reflectors on opposite sides of said channel.

14. A solid state lasing structure, comprising a field effect transistor formed of:

a solid, semiconducting light emitting organic polymer;

source and drain electrodes disposed on one side of said light emitting organic polymer;

a gate on the opposite side of said light emitting polymer, defining an active layer in said light emitting polymer whereby

current between the source and drain electrodes flows along a channel in said active layer to define a recombination and emission zone;

a gate insulator between the gate and the light emitting organic polymer; and

a glass substrate supporting said gate;

the index of refraction of said light emitting organic polymer and of said gate being greater than the index of refraction of said gate insulator and said glass substrate.

15. A solid state lasing structure, comprising a field effect transistor formed of:

a solid, semiconducting light emitting organic polymer having a 4-level lasing energy system;

source and drain electrodes disposed on one side of said light emitting organic polymer;

an indium-tin-oxide gate on the opposite side of said light emitting polymer, defining an active layer in said light emitting polymer whereby current between the source and drain electrodes flows along a channel in said active layer to define a recombination and emission zone;

a SiO_2 gate insulator between the gate and the light emitting organic polymer; and

a glass substrate supporting said gate;

the index of refraction of said light emitting organic polymer and of said indium-tin-oxide gate being greater than the index of refraction of said SiO_2 gate insulator and said glass substrate.